<u>Claims</u>

1. A method, including the steps of

maintaining a set of access control patterns in at least one associative memory;

receiving a packet label responsive to a packet, said packet label being sufficient to perform access control processing for said packet;

matching matchable information, said matchable information being responsive to said packet label, with said set of access control patterns in parallel, and generating a set of matches in response thereto, each said match having priority information associated therewith;

selecting at least one of said matches in response to said priority information, and generating an access result in response to said at least one selected match; and

-making a routing decision in response to said access result.

2. A method as in claim 1, including the step of performing at least two of said steps of receiving, matching, selecting, and making a routing decision, in parallel using a pipeline technique.

3. A method as in claim 1, wherein said access control patterns each include a bit pattern for matching and a mask pattern of bits not for matching.

Sequence No.: 5826

4.   A method as in claim 1, wherein said access control patterns each include a set of ternary elements, each representative of a logical "0," logical "1", or "don't care" value.

5.   A method as in claim 1, wherein said associative memory includes a hardware content-associative memory having a plurality of rows, each row including one of said access control patterns and one of said access results.

6.   A method as in claim 1, wherein said associative memory includes a hardware content-associative memory having a plurality of rows,

each row including a bit pattern for matching and one of said access results, and

each row being associated with a pattern of bits not for matching, said set of patterns of bits not for matching being fewer than a number of said rows.

7.   A method as in claim 1, wherein said associative memory includes a ternary content-associative memory.

8.   A method as in claim 1, wherein said packet label includes a source IP address or subnet, a destination IP address or subnet, a source port, a destination port, a protocol specifier, or an input interface.

Sequence No.: 5826

1   9.   A method as in claim 1, wherein said priority information for each

2   said access control pattern is responsive to a position of said access control pattern in a

3   memory.

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5   10.   A method as in claim 1, wherein said priority information includes a

6   position in said associative memory, and said step of selecting includes choosing a first

7   one of said matches.

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9   11.   A method as in claim 1, wherein said routing decision includes a

10   committed access rate decision.

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12   12.   A method as in claim 1, wherein said routing decision includes an

13   administrative policy decision regarding treatment of said packet.

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15   13.   A method as in claim 1, wherein said routing decision includes de-

16   termining an output interface for said packet.

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18   14.   A method as in claim 1, wherein said routing decision includes im-

19   plementing a quality of service policy.

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21   15.   A method as in claim 1, wherein said routing decision includes per-

22   mitting or denying access for said packet.

Sequence No.: 5826

16.   A method as in claim 1, wherein said step of generating said access result is responsive to a plurality of said at least one matches.

17.   A method as in claim 1, wherein said step of matching is performed in order of constant time, whereby said step of matching is performed in time not responsive to a number of said access control patterns.

18.   A method as in claim 1, wherein said steps of matching and selecting are performed at a rate exceeding 1 megapacket per second.

19.   A method as in claim 1, including the step of making a preliminary routing decision for said packet, wherein said packet routing information includes a result of said preliminary routing decision.

20.   A method as in claim 19, wherein said preliminary routing decision includes determining at least one output interface for said packet.

21.   A method as in claim 19, wherein said packet routing information includes an output interface for said packet.

1   22.   A method as in claim 1, including the step of preprocessing said

2   packet label to generate said matchable information.

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4   23.   A method as in claim 22, wherein said step of preprocessing includes

5   the steps of

6   performing an arithmetic, logical, or comparison operation on said packet

7   label; and

8   generating a bit string for said matchable information in response to said

9   arithmetic, logical, or comparison operation.

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11   24.   A method as in claim 22, wherein said step of preprocessing includes

12   the step of comparing a field of said packet label with an arithmetic range or mask value.

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14   25.   A method as in claim 22, wherein said step of preprocessing includes

15   the step of comparing a source IP port value or a destination IP port value with a selected

16   port value.

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18   26.   A method as in claim 1, including the step of postprocessing said

19   selected match to generate said access result.

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21   27.   A method as in claim 26, wherein said step of postprocessing in-

22   cludes accessing a memory in response to a bitstring included in said selected match.

28.   A method as in claim 1, wherein said set of access control patterns is responsive to a sequence of access control specifiers, each one of said sequence of access control specifiers declaring whether to permit or deny access for a set of packets.

29.   A method as in claim 28, wherein said step of maintaining includes the steps of

receiving said sequence of access control specifiers;

translating said sequence of access control specifiers into said sequence of access control patterns; and

storing said sequence of access control patterns in said associative memory.

30.   A method as in claim 29, wherein said step of translating includes the step of generating a plurality of said access control patterns in response to one of said access control specifiers.

31.   A method as in claim 29, wherein said step of translating includes the step of generating a single one of said access control patterns in response to a plurality of said access control specifiers.